



# Concrete Structures – General – Construction – Curing Concrete Structures

## Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	09-30-2022	Original	Richard Foley

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Contact [SC Technical Team F](#) for questions

## Background

This process establishes Structure Construction (SC) responsibilities and procedures for curing concrete structures, including authorization of curing methods for each component of concrete structures.

Application of the appropriate method for curing concrete structures is essential for concrete to attain the required strength, regulate heat of hydration, and prevent surface cracking.

Prior to reviewing this Bridge Construction Memo (BCM), it is essential to review the [Contract Specifications](#) (CS), Section 51-1.03H, *Concrete Structures – General – Construction – Curing*. The information in the CS typically will not be repeated in the text of this BCM.

## Process Inputs

1. [Form CEM-3101](#), *Notice of Materials to be Used*
2. Certificate of Compliance for each batch of curing compound per CS, Section 90-1.01C(5), *Concrete – General – General – Submittals – Curing Compound*
3. Safety Data Sheet (SDS) Data for curing compound materials
4. Authorized deck placement work plan

5. Stormwater Pollution Prevention Plan/Water Pollution Control Plan (SWPPP/WPCP) authorized submittals

## **Procedure**

1. All work associated with this process is charged as [Project Direct – Construction](#).
2. Inspection of field work for this process is:
  - [Continuous](#) inspection while curing compound is being applied.
  - [Intermittent](#) inspection for other methods of curing.
3. Before construction begins:
  - a. Review the following documents:
    - i. *Contract Specifications*:
      1. Section 90-1.01C(5), *Concrete – General – Submittals – Curing Compound*
      2. Section 90-1.01D(6), *Concrete – General – Quality Assurance – Curing Compound*
      3. Section 90-1.03B, *Concrete – General – Construction – Curing Concrete*, for the four methods of curing structure concrete.
      4. Section 51-1.01C(1), *Concrete Structures – General - Submittals – General*, for information related to a deck placement work plan.
    - ii. *Construction Manual*:
      1. Chapter 4, [Section 4-9001B \(3\)](#) *Curing Concrete*
      2. Chapter 4, [Section 4-9001B \(4\)](#) *Protecting Concrete*
      3. Chapter 6, [Section 6-107](#), *Materials Acceptance Sampling and Testing*, which contains information on sample types and frequencies.
      4. Chapter 6, [Section 203](#), *Manufactured or Fabricated Materials and Products Acceptance*
    - iii. The section titled, *Curing Concrete*, in [Chapter 5](#), *Concrete Construction*, of the *Concrete Technology Manual*
    - iv. The authorized deck placement work plan.
    - v. Form CEM-3101, *Notice of Materials to be Used*, for curing materials listed.
    - vi. Safety Data Sheet for curing compound materials.
    - vii. Authorized SWPPP/WPCP

- b. Check for adverse weather forecast prior to concrete placement (e.g., high temperature, rain that can affect concrete finishes, etc.).
  - c. Discuss concrete curing methods and requirements with the contractor, including inclement weather conditions. Refer to CS, Section 90-1.03B.
    - i. Discuss contingencies to address potential equipment failures related to severe environmental conditions such as high winds.
  - d. Collect a Certificate of Compliance (COC), including required test results, for curing compound materials delivered to the jobsite. Complete [Form SC-4102, Material Inspected and Released on Job](#), and file with COC in project records.
    - i. Coordinate with Materials Engineering and Testing Services Representative ([METS Rep](#)) for any questions about the curing compound.
  - e. Field sample curing compound when material is questionable. Check with the METS Rep for the correct curing compound sample canister or container. Send sample to METS through [Chemistry.Branch@dot.ca.gov](mailto:Chemistry.Branch@dot.ca.gov).
4. During Construction:
- a. Verify newly placed concrete for CIP structures (except for bridge deck) are cured using the water method or the forms-in-place method per the CS, Section 90-1.03B.
  - b. If forms are removed before the end of form-in-place curing period for CIP structures (except bridge deck), assure that forms are not removed earlier than 24 hours after concrete placement. In addition, concrete must be cured the-remainder of the curing period with one of the authorized curing methods in the CS, Section 90-1.03B.
  - c. For Bridge Decks, confirm that the contractor is following the authorized deck placement plan and take corrective action as necessary to assure compliance.
  - d. Verify that curing compound is:
    - i. Mixed at low speeds to completely redisperse settled or separated solids in containers before use. For additional information refer to the CS, Section 90-1.03B(3), *Concrete – General Construction Curing Concrete – Curing Compound Method*.
    - ii. Field sample if the material is questionable.
    - iii. Applied at nominal rate of 150 sq ft/gal with power-operated spraying equipment. Hand spray equipment are used when authorized by the Engineer.

- e. When curing structure by water method, verify that the contractor keeps the concrete surface wet throughout the curing period, including weekends and holidays. See [Attachment 1](#), *Bridge Deck Crack Prevention*, for information and project photos that depicts changes introduced by the revised CS for concrete decks. Review and ensure that contractor complies with authorized SWPPP/WPCP to prevent discharge of water from curing operation.
  - f. Refer to the CS for unique requirements of curing bridge decks constructed with Rapid Strength Concrete (RSC).
  - g. Document all inspection, construction, and quality assurance activities, pertinent to this BCM, in the Daily Reports per [BCM C-7](#), *Daily and Weekly Reports*.
5. File all project documentation (correspondence, materials acceptance documentation, Daily Reports, etc.) in the appropriate category in the project records as specified in the *Construction Manual*, [Section 5-102](#), *Organization of Project Documents*.

## **Process Outputs**

- 1. Curing compound certificate of compliance
- 2. Properly cured concrete structures
- 3. Daily Reports

## **Attachments**

[Attachment 1](#): *Bridge Deck Crack Prevention*